Evaluation of a Robotic Blockchain

Project proposal

1 Goals

We have recently developed a blockchain for robots, called RobotChain [1, 2, 3, 4].

It allows the registration of robotic events, the monitorization of robot activites, the use of artificial intelligence algorithms and also the control of robots, all with the good properties of a blockchain-based solution: data immutability, distributed processing and storage, secure transactions and the possibility of using smart contracts.

This project will focus on the evaluation of RobotChain on a network of robots. The code will be done using OCaml on Linux.

For further information about RobotChain, check the project's web page at `http://www.di.ubi.pt/~lfbaa/robotchain`.

2 Work Plan

The project has the following tasks:

T1 Introduction to blockchain and RobotChain (3 weeks).

T2 Study the requirements for the evaluation and setup all code and equipment (4 weeks).

T3 Implement new code to solve some of the remaining necessary requirements and perform the evaluation experiments (6 weeks).

T4 Write the project's report (2 weeks).

3 Technical and Academic Requirements

Be able to program using OCaml on Linux, use a source code repository and produce documentation (using doxygen, sphinx or other similar tool).

It is desirable that the student has grades above 13 on the following courses: Estruturas de Dados, Probabilidades e Estatística, Inteligência Artificial.

4 Expected Results

- An evaluation of the use of RobotChain under different setups with several constraints (time and computation);

- Source code and documentation of all code developed;
- Project report.

5 References

[1] Miguel Fernandes and Luís A. Alexandre. A time-segmented consortium blockchain for robotic event registration. *CoRR*, abs/1904.04306, 2019.

[2] Vasco Lopes and Luís A. Alexandre. Detecting robotic anomalies using RobotChain. In *19th IEEE International Conference on Autonomous Robot Systems and Competitions*, Porto, Portugal, April 2019.

[3] Vasco Lopes, Luís A. Alexandre, and Nuno Pereira. Controlling robots using artificial intelligence and a consortium blockchain. *CoRR*, abs/1903.00660, 2019.

[4] Vasco Lopes, Nuno Pereira, and Luís A. Alexandre. Robot workspace monitoring using a blockchain-based 3D vision approach. In *CVPR Workshop: Blockchain Meets Computer Vision & AI*, Long Beach, CA, June 2019. IEEE.